SUMMARY OF THE FINAL MEETING OF THE GREAT SALT LAKE WATER QUALITY SELENIUM STEERING COMMITTEE
May 29, 2008

GREAT SALT LAKE STEERING COMMITTEE MEMBERS PRESENT

Walter L. Baker, Chairman	Department of Environmental Quality
Dave Grierson	DNR/Forest, Fire & State Lands
Karen Hamilton	U.S. Environmental Protection Agency
Kelly Payne	Kennecott Utah Copper
Nathan Darnall	U.S. Fish & Wildlife Service
Jim Huizingh	Morton Salt
Leland Myers	Central Davis Sewer District/WQB/Citizen
Maunsel Pearce	Great Salt Lake Alliance
Chris Montague	The Nature Conservancy of Utah
Richard West	West Side Associated Duck Club
Delane McGarvey	Davis County Health Department
Richard Sprott	Department of Environmental Quality
David Naftz	U.S. Geological Survey
Clay Perschon	DNR/Division of Wildlife Resources
Richard Bay	Jordan Valley Water Conservancy District
Don Leonard	Utah Artemia Association

OTHERS PRESENT

Lynn de Freitas	Friends of Great Salt Lake
Melissa Olsen	Kennecott Utah Copper Corporation
Leah Ann Lamb	DEQ/ DWQ
Jodi Gardberg	DEQ/ DWQ
Bill Moellmer	DEQ/DWQ, Science Panel Chairman
Theron Miller	DEQ/DWQ, Science Panel Co-Chair
Renette Anderson	DEQ/ Office of Planning & Public Affairs
Donna Spangler	DEQ/ Office of Planning & Public Affairs
Jeff DenBleyker	CH2M Hill
Brent Goodfellow	Senator
Mark Stanger	DEQ/ Division of Water Quality
Lisa Kirschner	Parsons Behle & Latimer
Joy Emory	Citizen
Ying-Ying Macauley	DEQ/ Division of Drinking Water
Wayne Wurtsbaugh (Conference Call)	Utah State University
Reed Bodell	Kennecott Utah Copper (Alternate)
Bruce Waddell	Great Salt Lake Alliance (Alternate)
Florence Reynolds	Salt Lake City Public Utilities (Alternate)
Mark Atencio	Jordan Valley Water Conservancy District (Alternate)

1. Call to Order, Roll Call of Steering Committee and Audience Introductions:
Walt Baker of DEQ Division of Water Quality (DWQ) called the meeting to order and welcomed all in attendance. Roll Call of the Selenium Steering Committee was taken and the audience introduced.

2. Photographs and Presentation of Awards:
Walt Baker, DWQ presented awards to the Steering Committee and those who were active participants. He thanked them for their commitment of time, interest, passion and knowledge.

3. Approval of the May 2 and May 20, 2008 Meeting Summaries:
Walt Baker, DWQ asked if there were questions or comments concerning the May 2 and May 20, 2008 Meeting Summaries. Nathan Darnall, USFWS requested the words in the May 2 summary "volatilization loading" be changed to "volatilization and loading".

4. Summary of May 2, May 20 and May 23, 2008 Meetings:
Jodi Gardberg, DWQ provided a summary of the May 2 Joint meeting of the Steering Committee and Science Panel, May 20 Joint Meeting of the Steering Committee and Stakeholders and May 23 Preliminary Consensus Discussion Meeting of the Steering Committee.

5. Presentation of Assessment Strategy:
Bill Moellmer, DWQ reviewed the Assessment Methodology and the EC value to egg concentrations. The documents are posted at this web address:

Comments from the Committee:

Walt Baker, DWQ inquired if the selenium caps on all permits would be a loading cap or concentration based cap.

Bill Moellmer, DWQ answered that DWQ permits could be expressed in concentration or loading Concentrations are in the permits now but can be capped with loading.

6. Consensus Building
Renette Anderson, DEQ asked each individual steering committee member to put a dot on their position on a selenium water quality standard based on egg tissue concentration. Seven people placed a dot on 12.5 ppm, five dots were placed on 5.5 ppm and 4 were placed on 10.5 ppm. She then asked if each member could explain their vote and asked if they were comfortable moving their vote up or down in scale

Delane McGarvey, Davis County Health Department: I placed the dot on 10.4 ppm with an EC value of 6. I feel the state's been well served by the Science Panel and the consultants and contractors and everybody's input. I think we all agree with that. The standard is a trade-off between protection and regulatory or beneficial use and stopping any impairment of the species out there. If you refer back to this chart, it probably picked it up in a nutshell, when the EC 10 is on the border of observable in the field and not observable. I'm cognizant of the fact that there have been very conservative estimates designed into this and so I think the ecosystem is probably well protected with that. I'm uncomfortable with a standard which takes you to the observable effects in the field. It wouldn't take too much to move up or down in my vote

because I'm comfortable with the protection. The protection lies in the implementation plan. I do think that from the input we have received as a steering committee. For those who are interested in the Great Salt Lake, their interest, I take it, is not addressed by putting the standard right on the line between observable and non-observable. But even if you met that standard, you could be in the non-observable so it's just kind of a trade-off there. Another very important aspect is that I'm very pro consensus and moving this process along and so I would move up or down, but probably with consensus to go up.

Don Leonard, Utah Artemia Association: I gave a speech on Friday May 23 so I'll just abbreviate it. I would give great deference to the Science Panel given that I'm not a scientist. The selenium concentrations in brine shrimp may be approaching dietary levels of concentrations of adverse effects and so I'm concerned about that. I thought Brad Marden did an excellent job of discussing the brine shrimp issues in his paper, if you haven't read it. You should read it. And so, that's why I placed a dot on 10.4 ppm. I would move either way if there was a consensus formed in either way. I feel strongly, as I mentioned, at each at our last two meetings, about trying to reach a consensus or a super majority as a group.

Nathan Darnall, US Fish and Wildlife Service: I would like the public to recognize Walt Baker and the Division of Water Quality for all their efforts and for this ground-breaking effort. I don't have a plaque to give you but I definitely appreciate everything the Division has done as far as funding and the studies. Based on the results of the last 12 to 18 months we now know the concentrations of selenium in the lake are less than one part per billion. The concentrations in eggs at most locations are below what the service would consider background. That the average concentration of brine shrimp is approaching the dietary threshold and the brine fly larvae which are the primary dietary items of the birds at the Great Salt Lake and the shore birds have high concentrations of selenium and mercury in their blood and livers, that the amount of selenium in sediments has increased over pre-industrial levels, that concentrations of selenium in the water has increased during the period of study, that there may be a significant unmeasured additional contributions from groundwater and in addition, by comparing the recent data we have with data collected by the Fish and Wildlife Service a decade ago, I can say that concentrations of selenium in brine shrimp are higher than they were a decade ago. And the same thing for concentrations of selenium in blood and livers. And while mercury was not actively considered in this process, mercury in Grebe livers are also higher today than they were a decade ago. Even with all the data we have and all these great results, there are still a number of uncertainties and I would like to highlight some of these. What is the effects on those birds I call migrants like Grebes and blue wing teal? We recognize that usually reproduction is the most sensitive end point but if you had concentrations in selenium in the brine shrimp around 18, what would that mean for those birds?" And for the birds that over winter on the Great Salt Lake, like Shovelers and Golden Eyes. What about those birds that migrate here and spend three to four weeks loading up on selenium and then go to the breeding grounds in the spring? Interactions between selenium and mercury were not adequately looked at and of course those two things, the effect on reproduction of birds is synergistic and have a greater effect than individually. We don't know, necessarily, if concentrations are increasing over time at the Great Salt Lake and if it's going to continue to rise. If in the future, other species besides avocets are at the Great Salt Lake, what would the effects be? Pressures that global climate change might have on the Lake and how that might affect both species that occur here. So due to the number of uncertainties listed above and importance of the Great Salt Lake, and the fact that we're setting a tissue based criterion, it behooves us to take a precautionary approach and not advocate for a standard and enter application for a standard that

will be fully protective of the Great Salt Lake and beneficial uses thereof and not just partially protective and recommend a safe standard set for avian eggs be at 5 milligrams per kilogram dry weight basis. We strongly encourage the state to incorporate and consider the additive effects of selenium. We, or at least, I believe, the Science Panel recognized the importance of this in both selenium toxicity and its influence on the toxicity curves was put forward. Unfortunately, the panel didn't have time to take a look at that in detail because of either deadlines or because the paper wasn't published at the time they set the values. Anyway, we believe that the additive effects of selenium are an important consideration and should not be discounted in setting a standard for selenium. And the number that was put forward for at least considering these effects is at an EC10 of 7.7 ppm. I think I could move to 7.7 ppm and it would have to be because there is consensus. I will absolutely not go to 12.5 ppm So sorry about that.

Richard West, West Side Association of Duck Clubs: My Great Salt Lake hat says it is silly to implement a standard that makes things worse than they are and as I see it, setting a standard would do that. But, my realism hat says a standard needs to be set. I put my dot at 10.4 ppm and the reason I did that is because of this dilemma. I think we need to come together because if we don't, the Water Quality Board is going to set the standard based entirely on the recommendations of the Science Panel and I really think the setting at 12.5 ppm with a cap at 7.7 ppm realistically that cap becomes sort of a pseudo standard and my question is there a way around it. My concern is the rulemaking process and if the rules can effectively get around a standard. So I am in between because I really would like to see some consensus up or down and it wouldn't take me much to move either way.

Dave Naftz, US Geological Survey: I'm going to read a short summary of my feelings as well. Thanks for the opportunity to present my perspective and recommendations for a Great Salt Lake selenium standard. As most of my fellow committee members are aware, I had the opportunity to participate in both the data collection and interpretation of the selenium data during this collective study of the Great Salt Lake. My efforts on the study focus on the current and historic selenium loads on the Great Salt Lake. A number of important observations were made during these studies and have a direct bearing on my recommendation with respect to adopting this selenium standard for the lake. My recommendation is at 5 parts per million. These are my reasons: First, during the 16 month study period, the selenium concentration in the GSL and our open water monitoring sites essentially doubled. The measured selenium loads coming into GSL in combination with the measured removal processes indicated that the lake was not in equilibrium with respect to selenium during the 16 month study period. Results from the 16 month study period on the geochemical cycling of selenium indicated unmeasured selenium loads into the GSL that could be providing as much or more of the selenium load, over 3000 pounds per year that are coming into our six monitoring inflow sites surrounding the lake. Fourth, geophysical surveys conducted along the southern arm and eastern boundaries of the GSL indicated areas of ground water discharge that could potentially provide significant and unmeasured selenium load into the GSL. And finally, number five, sediment core records collected throughout the southern arm of the GSL indicated a 2-4 fold increase in selenium concentration from 1850 to present. So if we look back to past management decisions on GSL, they've been made without fully understanding the effects of their actions. For example, in the 1950's, we didn't realize that replacement of the old railroad causeway going across the GSL would create a layer of water with some of the highest concentrations of methyl mercury ever measured. Based on our current knowledge gaps on selenium cycling, are we missing a significant selenium load that could impact us in the future. Finally, the current assessment plan for future monitoring of GSL does not consider continued monitoring of selenium

loads into the system. Although the State of Utah has made numerous efforts to secure funding for continuation of selenium load monitoring, this has not occurred, and at this point I report we have no measurement of selenium concentrations or river discharges coming into the GSL since February of 2008. So with this, our current knowledge gaps of selenium cycling in GSL coupled with the limited long-term monitoring of selenium loads, I recommend the "no effect" concentration. I definitely am interested in reaching consensus. I think that's very important for this committee to do. But I'm not comfortable going all the way up to the 12.5.

Rick Sprott, Department of Environmental Quality: Thank you. The charge that we had as a steering committee was to recommend a site-specific numeric standard for GSL that prevents impairment of the beneficial uses. When we speak here, we're speaking of the ecological beneficial uses because they are the most sensitive. This steering committee was purposefully constituted of stakeholders rather than scientists. I, like most of you, probably with the exception of Nathan, was not trained in toxicology. So, what we've done as a stakeholder group steering committee is to create a group of eminently qualified scientists to advise us. Among that group there were three toxicologists – Dr. Scorupa, Dr. Adams and Dr. Fairbrother, all nationally recognized for their work on selenium. When the three were asked what standards protected the lake, there was not a consensus. However, two of three supported an egg based standard based on the EC10, while one supported his estimate of a "no effects" concentration. So we have disagreement among our expert advisors which is why we're here today. However, disagreement among scientists is, in my view, healthy. It promotes critical thinking, drives research and ultimately should result in a generation of sufficient data to allow consensus in the broader scientific community. However, disagreement in the scientific community should not drive decision makers to take extremely precautious positions just because there are uncertainties. That's not how we operate as individuals or as a society. So, we are left to make some judgments on the merits of the individual views. In our case, our path should be clear. Two of the three recommended a concentration of 12.5 ppm as protective of the lake. Further, I believe that Dr. Olendorf, who advised the panel and CH2M Hill and is another nationally recognized expert on selenium, would advise that the EC10 is protective. To take a significantly more conservative approach would be to place undue burden on society and on society through industry that yields no ecological benefit. I do find it wrong that some assert that Dr. Scorupa's voice is the most qualified voice and the one to which we should defer. To take that position is to abandon this process and the tremendous resources dedicated to it. It is to unduly dismiss the credentials of other Science Panel members. It seems that Dr. Skorupa is a minority force on both the Science Panel and in the national data on selenium. He has a responsibility to convince his peers on the merits of his arguments through data driven approach. Therefore, I say as a steering committee, we have no defendable position other than to advance the overwhelming majority of the Science Panel members and adopt an egg based selenium standard of 12.5 milligrams per kilogram dry weight for open waters. To do anything different would be arbitrary and impeach this process. We should then monitor what is sure to be a continuation of the national debate over selenium, started long before we started this process, and seek adjustments to management of the GSL as advancements in a toxicological debate go forward. I put my dot on the EC10, and the 12.5. I have reviewed the science reports and the methods and so forth and looking at those, I feel that there were conservative approaches taken with respect to the species, with respect to diet, and other considerations which do provide some protection. I'm certainly cognizant of the uncertainties that exist and the possibility, well, it's clear that we don't know everything we need to know but I think we need to make a decision that uses conservatism but maintains a realistic view towards this. Most of my practice has been in Air Quality. I have studied toxicology and

other things and risk management and I think this, though not as protective as some would prefer, is a reasonable and realistic point at which to begin our standard based on the science we have. I think our process allows for this with the collection of additional data, and there's no doubt in my mind that that work is going to continue and we will see information further develop. While not part of the setting of the standard, the Science Committee did recommend a rigorous monitoring and assessment scheme. There have been some proposals by the Division and discussion even this morning on how that might work and it seems to me that, at least in concept, a pretty thorough first step in going about that. That's what I support and I think, at this point in time, I'd probably be fairly comfortable about moving further down the scale for a variety of reasons but I'm certainly open to listen further.

Walt Baker, Division of Water Quality: Thank you very much. First of all, I have to say this is a remarkable process. Long ago, I kind of read the tea leaves and I suspected we would be where we are at right now, having this discussion. But, nevertheless, I've found, and I mentioned this last Friday, while we disagree on some aspects of this, we have not disagreed on the process. It's been an incredible process and I compliment all of you for that. Having said that, I voted for 12.5 ppm. I remind the Steering Committee that all of our other water quality standards, not only in the State of Utah but in the national water quality standards that EPA develops, are based on an EC20 not an EC10. There are some outliers. The Great Lakes Initiative is looking at, as well, a selenium standard at an EC10. This would be consistent with that. We have no discernable effects right now in the GSL for selenium and I think that 12.5 is conservative. I won't go in to why I believe that to be the case, but I do believe it is conservative, particularly based on the species chosen. I take a lot of comfort in the fact that we're going to revisit these water quality standards every three years and upon petition, we can even do it more frequently than that. We need more data. But until that time, we have the data to make a decision. I would not feel comfortable with an EC7. That would require us right now under the assessment protocol that we've established, to implement caps and I don't think there's been anything that indicates that that would be warranted. I'm interested in consensus too. I would hope that we would be able to leave with everybody on the same page but I, in good conscience, don't feel that good science and the protocol that we've established water quality wise for the last 60 years, can be sacrificed for trying to arrive at a consensus. Relative to the 12.5, I feel, is there anything that would make me comfortable about moving from that? Frankly, no. I think it's beyond conservative. I am very uncomfortable about the precedent of establishing an EC10 to do water quality standards. Now I know this is site-specific, but it gives me some pause to consider that we're deviating that time-held protocol of protecting the population and not the individual bird, or the aquatic organism that we're looking at. We live in a risk-based society and putting a standard that effectively eliminates the risk out there, I think, is contrary to how we as a society approach things and certainly water quality wise, how we approach things. But I thank you all again for your participation.

Mansuel Pierce, Great Salt Lake Alliance: Well, I'm up there at 5. I'm willing to go up. The purpose of a water quality standard is to set goals for protecting the resource. Protection of the resource is what drives the standard. The Lake is now, or appears to be, at a "no effect" concentration of selenium in eggs and water. Should we go as high as a 10% mean with the considerably higher average? I think a "no effect" level is doable or somewhere in between. I think this entire four year project has been precedent setting. We're doing this with wildlife tissue criteria. We're doing it in a terminal lake that can't be compared to any other system. We are also, potentially, setting a precedent that if we begin with an EC10 for selenium, are we beginning a string of EC10's with their cumulative impacts with the next contaminants as they come

along. In answer to the comment about leaving the process or ignoring the process if we fail to recognize the significance of two out of three Science Panel members who voted for the 12.5. I think the Science Panel has been consistently clear that their job was to define and interpret the science not to recommend the standard. This is our responsibility. As Steering Committee members, as policy makers, as citizens of Utah, it's our responsibility to make this decision. I'm proud to have been involved with this process from the beginning. We've played a major role in this development. I believe in it. I think it's a major advancement in conservation in Utah and in protecting the GSL ecosystem. And from the beginning, I've felt that this is a partnership among all of us sitting at the table. That being said, show me some evidence that the other partners are willing to compromise and I will respond in an attempt to reach consensus because I believe it's critically important to do that.

Kelly Payne: Thanks for my part in this. What we're talking about right now is the number, the standard. So I put my dot at 12.5 parts per million which is an EC10 amount. Let me tell you in brief summary form why I chose that amount and I'll give you some other thoughts on your second question. First of all, the good news from the studies performed over the past four years, the lake is not impaired and not even close. That's really good news. The reason I chose 12.5 is because from the science and the data the Science Panel gave us and the range of protectiveness at an EC10, 12.5 is the most likely number. Statistically, it is the most likely number when you look at the normal curve. I took into account the levels of conservatism that was built in up front before calculating that number. I considered the diet concentration from GSL. I considered that we pretty much all agree, and that's good news too, we have consensus that this would be a tissue based standard and it would be based on egg concentrations so we're looking at the most sensitive end point. I considered the Mallard toxicity curve data which has substantially conservatism built in before doing the calculations. I also considered that there would likely be an assessment methodology that we will talk about next that would be a companion to this recommendation. If it is the one that we've been talking about, it has steps that are so strictly conservative they scare me but they would have not de facto, but in essence they would have a limit on human caused discharges below an EC3 which is statistically below a statistically perceptible level. And I also considered that the standard would be reviewed periodically, as Walt explained, at least every three years to take into account any unknowns, any new data from studies that may come about from time to time rather than trying to build them in as uncertainties at this point in time. And I also considered the precedent that society has chosen for the level of risk in the range of effect concentrations. So those are the reasons I made that choice. What would it take for me to feel comfortable moving? I think I would be pretty uncomfortable. But if I did move, talking right now about the number, the standard, I could potentially feel comfortable moving downward slightly if a couple of things happened. First, if I heard from Walt that it would not create a precedent problem in the other standard setting methods throughout the State. And secondly, that we're not still talking about an assessment methodology as severe as the one before us but perhaps we allow the Division staff to create one separately after standard promulgation or perhaps more in line with the proposed antidegradation rule concepts that are being discussed. Thanks.

Leland Myers, Central Davis Sewer District: I began this process, as Walt stated, at an EC20 because that's where the vast majority of prior standards had been set and were developed. I believe that the process has shown us that there is considerable variability and as such, I think, I have been willing to compromise to come down to an EC10 value because I believe that it is significantly protective of the ecosystem and it was recommended overwhelmingly by the Science Panel. I believe that in addition to that, a significant

compromise has been placed on the table to allow the assessment methodology to become part of the rule. That has not been done before and it is significant. If I were to come down off of the 12, I would be very opposed to the assessment methodology being part of the rule. I do believe that we're setting a precedent and that precedent needs to be established based upon the best available science. Overwhelmingly, that science leads us to the EC10 conservatively set based upon the Mallard studies and upon 100% diet on the Lake and a whole bunch of other assessment of methods that were conservative or evaluation that was conservative in nature. As I said in my e-mail, the other reason I'll come down is if we can get a promise out of all the people who shoot birds to stop.

Dave Grierson, Division of Forestry, Fire and State Lands: On behalf of the Division of Forestry, Fire and State Lands, we are the governmental entity with the executive authority of the management of the sovereign lands of the State, which includes the GSL. I would like to thank the members and those involved who have contributed their time, their money and their talents and expertise. This has been a truly collaborative effort for the greater good of the GSL. I also believe that the work is just beginning. The monitoring efforts that are going to be implemented are critical and our mercury work is on deck. After carefully reviewing the recommendations from the Science Panel and reviewing the goals and objectives of the GSL Comprehensive Management Plan, which is the policy document that guides the decisions of the Division of Forestry, Fire and State Lands on the GSL, the use of the bird egg EC10 threshold of 12.5 milligrams per kilogram per dry weight is what the Division is comfortable recommending. This EC10 provides a conservative and defendable standard which the Division feels will not substantially impair the public trust resources that we protect. The Division takes comfort that the derived standard uses an indicator species, the Mallard that shows nearly twice the sensitivity of selenium induced teratogenisis in the birds actually using the lake. To compound the conservatism of the proposed standard, the assessment methodology creates an effective selenium standard for the permitting process to be essentially 7.5 milligram per kilogram for permitting. The Division reiterates the importance of the monitoring program so we can adjust the standard quickly and decisively if conditions warrant. I want to thank the Steering Committee for this opportunity. There are many thank you's that are justified to the Science Panel, to CH2M Hill, to the principal investigators and their teams, Walt and their staff here at DEQ and to all the others I didn't mention. I know this has been a true collaboration from a cast of hundreds. The work is important. Thank you. I am comfortable moving down if warranted. I relied heavily on the Science Panel and their recommendations and in the spirit of consensus I might be willing to go down to a 10.4, but to me, as far as permitting goes, with a 12.5, we are actually setting a standard at 7.

Clay Perschon, Division of Wildlife Resources: I placed my dot at the "no effect" level of 5 and the reasons that we chose that level was based on listening over this four year process to the Science Panel members and the investigators that were working on the lake of which we worked with Dr. Conover out there and helped him secure the samples from the gulls, particularly on the west side of the Lake. So we were a participant as well as an observer. And, I've listened to my colleagues, Nathan Darnall and Dave Naftz, scientists of which I have a great deal of respect for, and in carefully reading the position papers of the Science Panel members that were available at the time. I found that Dr. Skorupa's analysis most convinced me, of what can occur and what the impacts could be to the wildlife resource on the Lake. GSL is the 6th largest lake in the lower 48 and second to third biggest saline lake in the world. And what makes it unique here in the west and indeed the world, is with that hypersalinity, brine shrimp and brine flies are the source of food, are the

creatures that live in the Lake and there aren't significant small predators that are in the Lake. The abundance of those brine shrimp and those brine flies out there are absolutely astonishing and that why we have the 9-12 million birds that utilize the Lake here on an annual basis. Our GSL ecosystem program has intensively worked for 12 years, not only looking at the brine shrimp but also looking at the birds that take advantage of them. I'm also mindful of the fact that this is a terminal basin lake. We're setting standards here for something that's different than anywhere else. We don't have the flow-through capability that exists in fresh water systems and we have the potential of what goes in here, may stay here or may stay here for a longer period of time that it would in a fresh water system. And that demands extra caution. And, as somebody that has worked on this lake intensively for twelve years looking at the birds and looking at the brine shrimp, this lake has consistently reminded me that when I think I know something, I better be careful. Because we've tried to, as human beings and scientists, to learn from every single thing we do and to build upon that. But the one thing that is easy for all of us to fall in to, is to forget about what we don't know. And there's been a tremendous effort that's been put forth by everybody that is here and by the scientists that were involved both doing the work and providing the advice. And as I have gone through that information, Dave Naftz pointed out, and Nathan reminded us, there are many things that we don't know yet. For example, one bird that lives around GSL, the Snowy Plover that lives on its beaches. They are a sensitive species. There are not very many of those birds in the world. They live right there on the beaches of the GSL and take advantage of the food sources there. We don't know what the impacts are to those birds from the selenium. And further, we don't know if we are looking just at selenium. A couple of winters ago I attended a lecture at the University of Utah from the great biologist E.O. Wilson and came away from that lecture and went on to read some of his books and was guided with the notion that as natural resource managers we should back up three or four steps and understand how all of the pieces fit together and as Dave has pointed out to us, we have the highest levels of methyl mercury in this lake that have been measured anywhere. And so, I feel it is incumbent upon us to protect the resources of the lake out there, to approach this with caution and that is what guided us choosing a "no effect" concentration, along with coming to the meeting a week ago and listening to what some of the public had to say and listening to comments that were forwarded to us and also recognizing that the twelve years I've been working with the Lake, I've talked with people that use brine shrimp from all around the world and understand the importance of that to them for not only providing food stuffs that are imported into this country but used by the people that live in those parts of the world. I'm willing to, with all of the great effort that's been put into this process up until today, everybody has given 100% or more, to try and reach consensus. That was our goal to begin with, and with the assessment methodology, of having the assurances about the things that we don't know. There has to be, for me to move up, I have to be assured that we're going to be looking, we're going to be measuring, we're going to be considering what we're doing out here in this very unusual hypersaline environment. Thank you.

Chris Montague, The Nature Conservancy: My thanks to everybody here and to the Science Panel for a huge amount of commitment and thought and professionalism and care in their work to get us this far. I was sorry to miss last Friday's meeting but, I am sure there was some great, interesting discussion going on during that, but I'll try to boil my position down to its bare bones. I think it has to do with the most fundamental question as to "What is the degree of protection that we want to bring?" And I think that our different interpretations of the word "protection" or "prevention" is really responsible for kind of the spread that you see up there on the chart. And I think there is some difference of opinion on that. Even

the Science Panel, who we think of as our most objective panel, for the first part of its tenure, was using in their discussions a lot of words such as "reasonably protective" or "acceptably protective" or "adequately protective" or "significantly protective." And to me, they actually stopped doing that as time went on because I think our charge that we received at the Steering Committee level was, in my mind, a pretty clear line. It's either "fully protective" or it's only "partially protective." This is kind of a no damage, some damage, kind of a line and I think that what we're seeing is a difference of opinion of what "protective" means. My interpretation, and I think probably the reasonable public expectation, is that we would be fully protective. In my mind and my vote, 5 ppm, that is the fully protective standard. It's odd and unusual, I think, that my position appears on kind of the radical fringe of the full voting over there when I really think that what we need to do is hear as clearly as we can the rationale for adopting a standard that incorporates some damage in the highest confidence level of the curve. That is really the hurdle to get over and the hurdle I'm having a hard time getting over is that especially in light of the opportunity we have where there isn't a violation now, where we're way low on the levels, why would we set a standard that built in some impairments, some damage to the resource rather than take advantage of this opportunity and set a standard that will keep us away from that. So I think that philosophical difference is really what separates some of those votes. If we do incorporate a standard that has some damage, whether it's detectable or not, that's a detectability question. I think everybody agrees that 12.5 is going to cause some damage. That's where our highest confidence level is on the curve. If we're going to do that, then I think it appears that we've had one use, one beneficial use of the lake, actually trump another beneficial use of the lake. And that is not a good message or interpretation that we want to have to talk to the public about. So I think we have the opportunity now, as never before, in having a lot of latitude in setting a standard and to me, it makes sense to set a standard that is fully protective. As far as the assessment strategy and the emergence of the assessment strategy importance, I think this is really a major development and especially if a standard includes that 12.5, does include a high confidence level that some effect will be there whether it's fully detectable or not. Then we really need to pay attention to the assessment strategy because in effect, I agree with some of the other comments that were leaning this way. It really is on-the-ground protection. It's the way the resources will be protected rather than the standard itself, which accommodates some effects, some level of effect. So I think that we need to be careful about that and I applaud the idea that it would be included in rulemaking and I think that even this is an interesting mental exercise that we're all playing because we're, if there's one thing that we have total consensus on, I think the Science Panel had total consensus on, was that even 12.5 was sufficiently high – we never want to get there. So we're saying, really, 12.5 is protective enough but we really don't want to get there. I think we have to acknowledge that ambivalence and in my mind, the assessment strategy is sort of assuming the real world protection of the resource. I'm not sure that leads anywhere. Consensus, I think, is very important and I am willing to move up from that if there's a good faith effort on the part of those who are willing to move off their first vote position. I'm willing to go down if Leland can convince me.

Jim Huizingh, Morton Salt: I put my dot at 10.4. But I did it partly for the same reason that Delane did. Looking at the graphs one final time before the vote, I felt more comfortable where not observable in the field. It gave me a better level of comfort. The assessment methodologies also gave me a great level of comfort if they're, in fact, part of the process, because at a 10.4, 4.2 is really the first trigger and that's even below the 5. So, that seemed to, as compromising abut the Lake is a huge lake. It does seem to have an ability to control its own level of selenium to some degree. We don't have a lot of data on it but it's been there for thousands of years and yet the selenium concentration hasn't done what the salt does and I'm in

the salt business and I know that the sodium chloride just stays in the solution and just gets more and more concentrated. The selenium doesn't seem to do that. The mass balance was of great interest to me although it's not a perfect balance, it gave me an indication that not a lot of the selenium goes into the food chain. A lot of it goes places that takes a while for the Lake to react to. A small increase or decrease in one year may not be seen for a year or two or even more, later, depending on what happens in the Lake and aerobic zones, whatever. I didn't want to go too low with the standard because knowing that there might be some spikes naturally occurring, or man-made, the Lake probably would take care of that over the long term so I felt comfortable at the 10.4. As far as moving, I could probably easily move back to the 12.5, a little less chance of going down. I don't think I could go to a 5 though.

Karen Hamilton, Environmental Protection Agency: Well, I'd like to echo what other people have said, that this has been a remarkable scientific and review process and it's mostly because of two things: DEQ's leadership and commitment as well as the collaborative activities and commitment by everybody else around the table, the Science Panel and the folks in the audience who have considerable interest. I think that goes to Utah's collaborative sense. I guess that's what I've noticed in Utah a lot more than other places and I really appreciate that. You've set a national model for establishing or attempting to establish a very difficult standard. This is something that other states, nationally, cannot seem to get a grip on and yet you people here in Utah have been able to do that so I think you all deserve a great deal of credit for that. I'd like to echo previous comments that this is a unique waterbody. It's a terminal lake. As some other people have noted, none of EPA's criteria are based on an EC less than 10. Most of them are greater than 10. And so, based on the science that we were provided, 12.5, whether it's a geometric mean or not to exceed would be something that would be consistent with the Clean Water Act, our regulations and I would have no reason other than to recommend an approval for that level. The assessment methodology is really a notable and in fact, I would call it a very exciting development and a very interesting use of the antidegration policy. It's an excellent tool that's an example of Utah's creative approach of finding some consensus and use of the Clean Water Act tools in addition to the required triennial review. I would also recommend that DEQ fold into the monitoring strategy that will be developing over the next year any plans before the GSL. Now having said that, I also say that the lower numbers are attainable right now. To exceed 5, apparently would require, based on one of these tables here, a two-fold increase in the concentration of water column selenium. The State could also adopt a standard to prevent further increase, in other words, a sort of an antidegredation standard, and someone has pointed out, standards are goals. So, either way, this is why I was ambivalent on what to choose as an EPA representative, either way would be approvable and defensible under the Clean Water Act requirements. Personally, I am troubled by the gap between current concentrations whether we're talking about egg tissue or we're talking about water column, and the proposed 12.5 for egg tissue. It seems like a long ways to go between where we are now and a standard. It's not to say that it's unprecedented, at all, anywhere. But again, I just wonder, what are the plans for that assimilative capacity? The people that are concerned about having anything lower than 12, are there plans for using in the future that capacity in the lake that seems to be existing right now? So those are my own personal concerns and observations. As I just said, EPA could approve and defend anywhere in that range that we're considering.

Renette Anderson, DEQ: Acknowledged the strong desire for consensus and reminded the committee that a super majority required 12 people

Mansuel Pierce, Great Salt Lake Alliance commented that consensus was dependant on the number and the assessment plan which didn't seem connected in people's conversations.

Walt Baker, DWQ said that he presumed everybody voted on a number based on the assessment methodology and explained that the standard and methodology first go to the Water Quality Board and then out for public opinion, so members of the steering committee can have more input then. He said some people were willing to consider coming down from a 12.5. At least one person said the assessment methodology would have to be removed to go below 12.5 and people willing to do 5 he presumed voted that way with the implementation plan.

Kelly Payne, Kennecott Utah Copper, thought the assessment methodology needed some work before it is adopted. He supported the concept, but the trigger levels and the response actions need to be debated more than just in this forum, this one time. Specifics such as the cap and the arbitrary nature of the 60-40-80 % trigger levels.

Mansuel Pierce, Great Salt Lake Alliance said his vote was made purely on "no effect" without consideration of the methodology. Yet the assessment methodology could be the means to reach consensus. He suggested that people get together in individual groups and talk about the number they chose and a possible change in number.

Kelly Payne, Kennecott Utah Copper, commented that there were several departures from what has been developed in the Water Quality Standards Working Group who have debated the antidegradation policy. He asked that the same antidegradation policy being adopted out of the working group be used and suggested using existing policies and regulations as a better way of rulemaking. He expressed concern over the precedent setting aspects

Walt Baker DWQ, replied that this will be a site-specific standard to the open waters of the GSL and can differ from other standards and can have elements of that in the footnote to implement the standard. This could stand alone, independent of the antidegradation which would apply to all other waters in the State. The reason why the assessment methodology was introduced was to build consensus and to offer protection for those that want to be cautious and vigilant. He said that he was interested in bringing this to the Water Quality Board and getting this out for the public to review.

Don Leonard, Utah Artemia Association suggested an alternative assessment methodology to reach consensus. thought the most productive thing to do was to look at where there was consensus. To reach consensus the only place to go would be 10.4 with the assessment methodology but perhaps to modify it slightly to have three tiers, get rid of the orange tier, set the blue tier at 50%, which would effectively put it at 5.0 ppm and the same as the antidegradation new rule. Put the yellow tier at 75% which effectively puts it at 7.8 and the red level at 100% which would be slightly more stringent than what we have here because here it's at 12.5 instead of 10.4 to set consensus. The committee will have to agree to this, live with it and be mutually supportive of it even though it's not first choice.

Those that agreed on a numeric standard, split into groups to discuss options and willingness to change for consensus. Richard Bay, Jordan Valley Water Conservancy District and Mansuel Pierce, Great Salt Lake Alliance presented the groups opinions.

Richard Bay, Jordan Valley Water Conservancy District : We met with those who had voted on the 12.5. There were misgivings about coming down from an EC20 to an EC10. Great concerns were raised about the level of compromise needed to reach a consensus that departs from the precedent of standard setting in the state and in the nation and the dangers that would open including perception from the legislature or legislative actions. The results of discussion were is there in a way to accomplish a lower level that is being advocated, especially one that would have an effect very low on the scale, approaching "no effect." Others, who had misgivings about the assessment methodology said yes, in the spirit of compromise, let's link the two of them together, recommend that 12.5 that includes a 60% cap of all, any man-made discharges and in essence, taking the regulated level essentially down to the 7.5 level from 12.5. And so, based on that, none in the group wanted to change from the 12.5 downward.

Mansuel Pierce, Great Salt Lake Alliance: In the spirit of attempting to reach consensus, we were willing to move upward to a 10.4. Assuming that along with that, we had the assessment implementation plan as described and also some assurance that a super majority would be created at 10.4 with significant input into the details of the assessment as they are developed. That would require a few people that are at 10.4 either for staying there or others coming upward to 10.4, doubling what was agreed upon in the beginning as a conservative "no effect" level. We are uncomfortable with it. I still don't understand the precedent argument because this is a unique resource that deserves protection and to consider an EC20 for this resource is beyond the scope of my imagination, or the degree of the protectiveness that we need to be for GSL.

Walt Baker, DWQ asked representatives of the groups to present their positions to the Water Quality Board meeting to be held on June 20, 2008. He asked Chris Montague to represent those who voted for 5.5 ppm as the standard, Don Leonard to represent 10.4 ppm and Richard Bay for those who voted for 12.5 ppm. He asked that the position papers be prepared by June 13, 2008 to be included in the Water Quality Board Packets sent out prior to the board meeting.

He congratulated all the members for their efforts

The meeting was adjourned at 1:00 PM.